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Art Unit: 1764

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the Application:

Listing of the Claims

Pending Claims

1 - 20 (canceled)

21. (canceled): ~~A process for the production of refinery transportation fuel or blending components for refinery transportation fuel, which process comprises:~~

~~reacting a petroleum distillate consisting essentially of material boiling between about 50° C. and about 425° C. comprising a mixture of sulfur containing, nitrogen-containing and other organic compounds derived from natural petroleum with a source of hydrogen at hydrogenation conditions in the presence of a hydrogenation catalyst to assist by hydrogenation removal of sulfur and/or nitrogen from hydrotreated distillate;~~

~~partitioning by distillation the hydrotreated distillate to provide at least one low-boiling organic part consisting of a sulfur lean, mono-aromatic-rich fraction collected below a temperature in the range from 260° C. to 300° C., and a high boiling organic part consisting of a sulfur-rich, mono-aromatic lean fraction;~~

~~contacting a gaseous source of dioxygen with at least a portion of the low-boiling organic part in a liquid reaction medium containing a particulate, heterogeneous oxygenation catalyst system which exhibits a capability to enhance the incorporation of oxygen into a mixture of liquid organic compounds and comprises one or more catalyst metal selected from the group consisting of chromium, molybdenum, bismuth, manganese, iron, and platinum, employed as metal oxide, mixed metal oxide, and/or basic salts of the metal or mixed metal oxide, while maintaining the reaction medium substantially free of halogen and/or halogen-containing compounds, to form a liquid mixture comprising hydrocarbons, oxygenated organic compounds, water of reaction, and acidic co-products , such that the oxygenation of the hydrocarbon portion of the liquid mixture is more than 1 percent by weight ;~~

~~separating from the mixture at least a first organic liquid of low density comprising hydrocarbons, oxygenated sulfur containing, oxygenated nitrogen containing and other oxygenated organic compounds and acidic co products and at least portions of the catalyst metal, water of reaction and acidic co products, and a second separated liquid which is an aqueous solution containing at least a portion of the oxidized sulfur containing and/or nitrogen containing organic compounds; and~~

~~recovering a low boiling oxygenated product having a low content of nitrogen, acidic co products and a sulfur content of no more than 15 ppm.~~

22. (canceled): ~~The process according to claim 21 wherein the hydrogenation catalyst comprises at least one active metal, selected from the group consisting of the d transition elements in the Periodic Table, each incorporated onto an inert support in an amount of from about 0.1 percent to about 20 percent by weight of the total catalyst.~~

23. (canceled): ~~The process according to claim 21 which further comprises recovering at least a portion of the heterogeneous oxygenation catalyst system and injecting all or a portion of the recovered catalyst system into the liquid reaction medium.~~

24. (canceled): ~~The process according to claim 21 wherein the oxidizing agent comprises a gaseous source of dioxygen.~~

25 (canceled): ~~The process according to claim 21 wherein the heterogeneous oxygenation catalyst system comprises an oxygenation catalyst containing from about 1 percent to about 30 percent chromium as oxide and from about 0.1 percent to about 5 percent platinum on a support comprising gamma alumina.~~

26. (canceled): ~~The process according to claim 21 wherein the heterogeneous oxygenation catalyst system comprises chromium molybdate or bismuth molybdate and optionally magnesium.~~

27. (canceled): ~~The process according to claim 21 wherein the heterogeneous oxygenation catalyst system comprises gamma alumina and a catalyst~~

~~represented by the formula $Na_2Cr_2O_7$ in an amount of from about 0.1 percent to about 1.5 percent of the total catalyst system.~~

28. (canceled): ~~The process according to claim 21 further comprising blending at least a portion of the low-boiling oxygenated product with at least a portion of the high-boiling product to obtain components that exhibit sulfur levels of less than about 15 ppm, for refinery blending of ultra-low sulfur transportation fuel.~~

29 & 30 (canceled)

31. (new): A process for the production of refinery transportation fuel or blending components for refinery transportation fuel, which process comprises:

reacting a petroleum distillate consisting essentially of material boiling between about 50° C. and about 425° C. comprising a mixture of sulfur-containing, nitrogen-containing and other organic compounds derived from natural petroleum with a source of hydrogen at hydrogenation conditions in the presence of a hydrogenation catalyst to assist by hydrogenation removal of sulfur and/or nitrogen from hydrotreated distillate;

partitioning by distillation the hydrotreated distillate to provide at least one low-boiling organic part consisting of a sulfur-lean, mono-aromatic-rich fraction collected below a temperature in the range from 260° C. to 300° C., and a high-boiling organic part consisting of a sulfur-rich, mono-aromatic-lean fraction;

contacting a gaseous source of dioxygen with at least a portion of the low-boiling organic part in a liquid reaction medium containing a particulate, heterogeneous oxygenation catalyst system which exhibits a capability to enhance the incorporation of oxygen into a mixture of liquid organic compounds and comprises one or more catalyst metal selected from the group consisting of chromium, molybdenum, bismuth, manganese, iron, and platinum, employed as metal oxide, mixed metal oxide, and/or basic salts of the metal or mixed metal oxide, while maintaining the reaction medium substantially free of halogen and/or halogen-containing compounds, to form a liquid mixture comprising hydrocarbons, oxygenated organic compounds, water of reaction, and acidic co-products, such that the oxygenation of the hydrocarbon portion of the liquid mixture is more than 1 percent by weight ;

separating from the mixture at least a first organic liquid of low density comprising hydrocarbons, oxygenated sulfur-containing, oxygenated nitrogen-containing and other oxygenated organic compounds and acidic co-products and at least portions of the catalyst metal, water of reaction and acidic co-products, and a second separated liquid which is an aqueous solution containing at least a portion of the oxidized sulfur-containing and/or nitrogen-containing organic compounds; and

recovering from the first organic liquid a low-boiling oxygenated product having a low content of nitrogen, acidic co-products and a sulfur content of no more than 15 ppm .

32. (new): The process according to claim 31 which further comprises contacting all or a portion of the separated first organic liquid with a neutralizing agent comprising a bicarbonate selected from the group consisting of sodium, potassium, barium, calcium and magnesium bicarbonate thereby recovering a low-boiling oxygenated product having a low content of acidic co-products.

33. (new): The process according to claim 31 which further comprises contacting least a portion of the high-boiling organic part with an immiscible phase comprising at least one organic peracid or precursors of organic peracid in a liquid reaction mixture maintained substantially free of catalytic active metals and/or active metal-containing compounds and under conditions suitable for oxidation of one or more of the sulfur-containing and/or nitrogen-containing organic compounds;

separating at least a portion of the immiscible peracid-containing phase from the oxidized phase of the reaction mixture; and

contacting the oxidized phase of the reaction mixture with a solid sorbent, an ion exchange resin, and/or a suitable immiscible liquid containing a solvent or a soluble basic chemical compound, to obtain a high-boiling product containing less sulfur and/or less nitrogen than the high-boiling fraction.

34. (new): The process according to claim 33 which further comprises blending at least a portion of the low-boiling oxygenated product with at least a portion of the high-boiling product thereby obtaining components that exhibit

sulfur levels of less than about 15 ppm, for refinery blending of ultra-low sulfur transportation fuels.

35. (new): The process according to claim 33 wherein the hydrogenation catalyst comprises at least one active metal, selected from the group consisting of the *d*-transition elements in the Periodic Table, each incorporated onto an inert support in an amount of from about 0.1 percent to about 20 percent by weight of the total catalyst.

36. (new): The process according to claim 33 which further comprises recovering at least a portion of the heterogeneous oxygenation catalyst system and injecting all or a portion of the recovered catalyst system into the liquid reaction medium.

37 (new): The process according to claim 31 wherein the heterogeneous oxygenation catalyst system comprises an oxygenation catalyst containing from about 1 percent to about 30 percent chromium as oxide and from about 0.1 percent to about 5 percent platinum on a support comprising gamma alumina.

38. (new): The process according to claim 31 wherein the heterogeneous oxygenation catalyst system comprises chromium molybdate or bismuth molybdate and optionally magnesium.

39. (new): The process according to claim 31 wherein the heterogeneous oxygenation catalyst system comprises gamma alumina and a catalyst represented by the formula $Na_2Cr_2O_7$ in an amount of from about 0.1 percent to about 1.5 percent of the total catalyst system.